

Head On™ 2

PART NO.
420-0311

MANUFACTURED BY

Gremlin®
Industries, inc.

OWNER'S MANUAL

HEAD ON 2
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HEAD ON 2 OWNER'S MANUAL

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INTRODUCTION

This is an electronic game that makes extensive use of digital integrated circuitry and television monitor circuitry. This manual assumes the maintenance technician possesses a general knowledge of solid state circuitry, microprocessor, TTL digital integrated circuitry and T.V. monitor concepts. Any individual NOT knowledgeable in these areas SHOULD NOT attempt repair of the electronic portion of this game. IT SHOULD BE NOTED THAT ANY ATTEMPT TO REPAIR THE GAME IN THE FIELD WITHOUT EXPRESS CONSENT OF THE FACTORY WILL IMMEDIATELY VOID THE WARRANTY!!!

IMPORTANT NOTES:

- | | |
|----------------|--|
| NEVER | replace any components with anything other than exact replacement parts. (See Parts List located on Service Schematics. |
| NEVER | remove circuit boards/connections while power is on. |
| DO NOT | replace the fuse with anything other than the proper value. A blown fuse indicates an overload condition within the game. Replacing the fuse with a higher value can cause severe damage to internal components if an overload occurs. |
| ALWAYS | consult the manual before attempting repairs. |
| CORRESPONDENCE | regarding this game should be addressed to: |

GREMLIN INDUSTRIES, INC.

8401 Aero Drive

San Diego, California 92123

(714) 277-8700

IMPORTANT NOTE

An important service note is posted in this game and is repeated here for emphasis:

IF AT ANY TIME THE T. V. SCREEN SHOWS A MEANINGLESS DISPLAY
OR THE GAME OTHERWISE MALFUNCTIONS, SIMPLY DROP A COIN INTO
THE COIN MECHANISM. THIS SHOULD CORRECT THE PROBLEM. IF
NOT, THE GAME REQUIRES SERVICE.

The circuitry in this game has been arranged so that the insertion of a quarter through the coin mechanism will reset the system. This clears up temporary problems caused by power line disturbances, static, etc.

SERVICE TECHNICIAN NOTE:

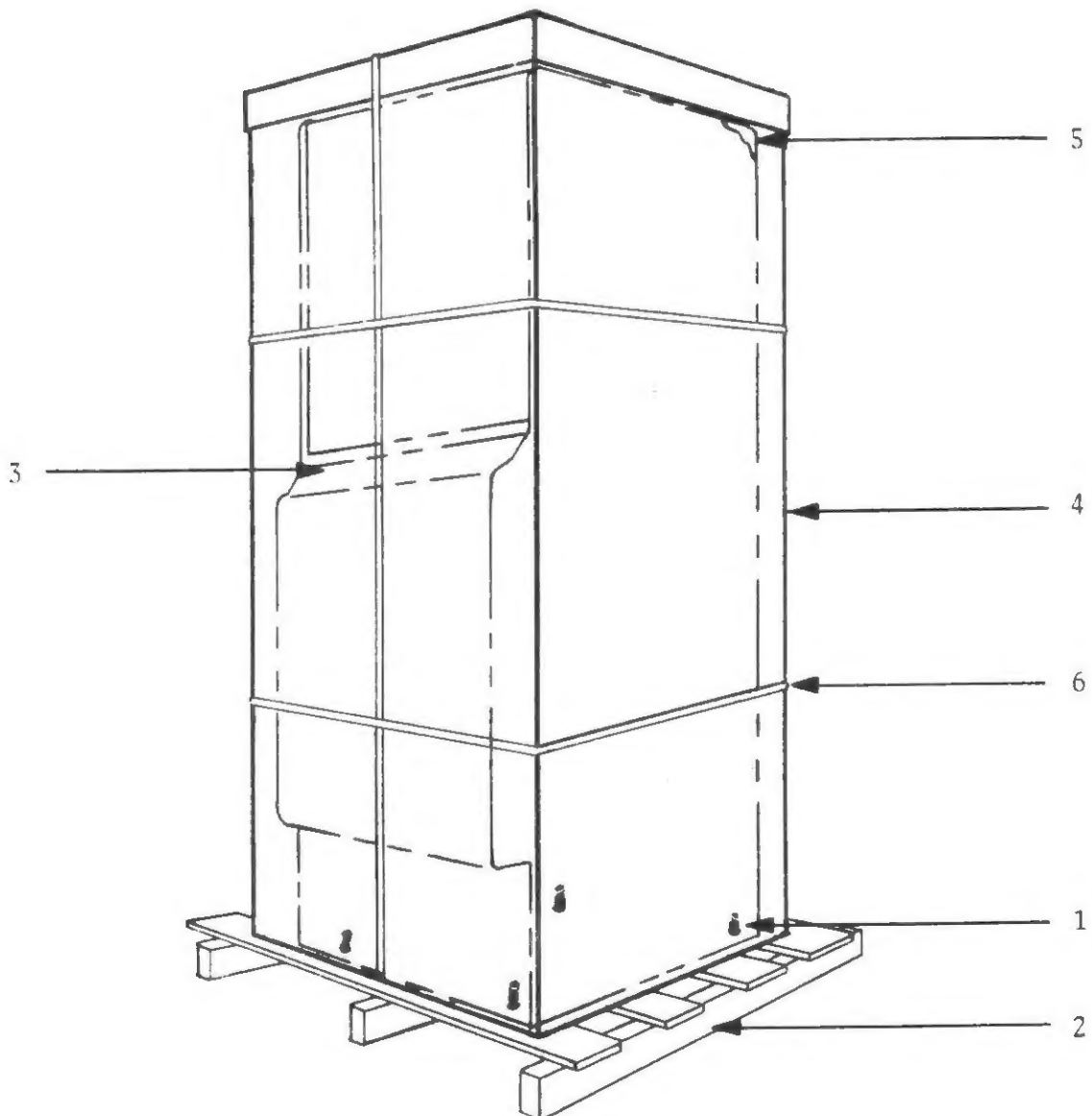
The system reset circuitry described above requires that the coin counter is attached to the system. If there is a coin counter problem and no replacement is available, the game will function properly if a 10K Ohm resistor is connected across the coin counter input pins to the video logic board.

REPACKAGING INSTRUCTIONS

Should it be necessary to ship this game, follow the instructions below for game crating:

- A) If the original shipping bolts have been discarded (Ref.1), obtain four 5/16-18x1 3/4" hex head bolts with 5/16" flat washers. Carefully lay the game on its side and attach skid (Ref.2).
- B) Place game upright. Tape game keys to upper flange of operator's panel (Ref.3). Crate the game using appropriate shock-absorbent packing material (Ref.4). Include padding on all four corners of the game (Ref.5). After crating is completed, secure package with strapping (Ref.6).

NOTE: If the game is to be shipped to GREMLIN for service or repair, attach a tag identifying the distributor and indicate the service or repair to be made; include the full serial number of the game. GAME MUST BE SHIPPED PREPAID.



HEAD ON 2-GAME CONCEPT

The most noticeable change on Gremlin's new HEAD ON 2 game, is the addition of two turn-around lanes on either side of the screen. With these turn-around lanes, HEAD ON 2 becomes a different game, even more challenging and exciting.

The game begins by displaying the following information on the screen:

```
BONUS
200
POINTS PER ... = 5
POINTS PER ♦♦ = 10
```

The computer's car and the player's car start at the bottom of the screen. When the player clears all lane markers against one computer car, he is awarded the 200 BONUS points and then is pitted against 2 computer cars. After clearing the lane markers again, 3 computer cars appear. Finally, 4 computer cars are the maximum amount that drive against the player. Each time a player clears all lane markers, the BONUS POINTS value is increased, so that more bonus points are awarded for beating 2 computer cars than for beating 1. In addition, the POINTS PER dot/diamonds values increase each time the bonus is awarded.

In HEAD ON 2, the player now has a few more lane options open to him in order to gain the most points and avoid a collision with the computer car. For example, if the player reverses his car's direction by passing through a turn-around lane, he then becomes either the pursuer or the pursued. If he is pursued by the computer car, the player must be careful to avoid a rear-end collision. If the player is following a computer car, he must again watch for a possible rear-end collision into the computer car. The different possibilities are what makes HEAD ON 2 an even more challenging and strategy-demanding game.

Also, each game is different from the next. While it is tempting to find a winning pattern, the game will not necessarily respond the same way every time. Because of the varied combination of action, a working pattern for one game may not work for the next. This feature will keep them playing game after game; and, each time, new video excitement is there for all players.

Refer to the OPTIONS section of this manual for instructions on changing the number of player cars.

MAINTENANCE PROCEDURES- HEAD ON 2

I. POWER SUPPLY (refer to drawing #815-0020, sheet 4)

1. Remove output connectors from power supply.
2. Make these initial tests: (GND to BLACK lead on c18, 9000 mfd capacitor)
 - a) +9 V DC on POSITIVE terminal of C18
 - b) +17-19 V on C6 (4700 mfd. cap.)
 - c) -17-19 V on C5 (4700 mfd. cap.)
 - d) -12 V at pin 11 (adjustable by trim pot R42)
 - e) +12 V at pin 12 (adjustable by trim pot R8)
 - f) +5 V at pins 18-20 (adjustable by trim pot R9)
 - g) GND (ground, 0 V) at pins 14-16
 - h) 2-3 V AC at pin 13 (Don't forget to change meter scale to AC)
3. Check these voltages again with the logic board connected. If any are wrong, a loading problem exists in the logic board, most likely.
Possible causes of a short on the logic board could be: U73, C21, C25, or C26.

II. SOUND BOARD (refer to drawing #822-0002, sheet 6)

1. If no sounds are produced:
 - a) check connections between logic board (labelled "Sound Out") and Sound board (pins 1 through 14) and between the Sound board and the Power Supply.
 - b) If they are good, check IC U16 on the logic board, pins 2,5,6,9,12, 15,16, and 19 for outputs when each sound is produced.
 - c) If the outputs are present, check the output of the sound board, pin 5. If the signals are present here (use an oscilloscope for best results) check the amplifier circuit on the power supply, specifically, U4, Q8, and Q9.
2. If some sounds are produced, but not all:
 - a) repeat steps a and b, above.
 - b) If these prove OK, check the specific circuit for each sound:

SOUND TYPE:	SOUND BOARD PIN #:	CHECK THESE PARTS:
Crash	Pin 1	Q2, U2, U1, U13
High Speed (computer car)	Pin 2	Q8, U9, U8, U7
Car on	Pin 3	Q9, Q6, U9, U12, Q10, U6, U5

MAINTENANCE PROCEDURES- cont'd.

High Speed (player car)	Pin 4	Q12, Q10, U12, U6, U5
Screech #1	Pin 6	Q14, U10, D7
Screech #2	Pin 7	Q13, U10, D6
Bonus	Pin 8	Q5, U4, U10, D8, C19

III. LOGIC BOARD (refer to drawing #822-0001, sheets 4,5, and 6)

1. Game does not reset at power on: (see sheet 5)
 - a) check connector pin 3 on logic board for 3 V AC signal. Also, check Q10, Q11, U55, U54, and U71.
2. No video: (see sheet 5)
 - a) check U48 (part #315-0042) for video signals. Also, check U41, Q6 and Q7 for the video signals.
3. Game does not coin: (see sheet 5)
 - a) Check coin switch connections to the logic board; make sure the coin switch is wired correctly.
 - b) Check U12, pins 3 and 11 for a pulse each time the coin switch is activated. Also, check U11 and U13.
 - c) Check also for the 4 msec. pulses at pin 7 of U10. These pulses serve as timing for the video circuit. Check also pin 5 of U11; pin 6, U13.
 - d) If a game is started only occasionally when a coin is deposited, the coin switch wire may need to be adjusted for a lighter, or heavier, tension.
 - e) If the coin counter does not activate, check U12, pin 3 for a pulse each time the coin switch is activated; also, check Q1 and Q2. (see sheet 5)
4. No \emptyset 1 clock pulses to the microprocessor: (see sheet 4)
 - a) check for pulses at the crystal, Y1.
 - b) check for pulses at pin 6 of U68; at pin 6 of U49; and at pin 4 of U54.
5. No player control: (see sheet 5)
 - a) make sure the player control connections from the switches to the

MAINTENANCE PROCEDURES~ cont'd.

logic board are intact. Ensure that each switch is connected.

- b) If these are good, check for an output from U1 as you push each switch.

6. Random display on the screen:

- a) If the screen shows what appears to be a meaningless display, and it cannot be cleared by activating the coin switch, several different parts of the circuit should be considered:

One or more RAM's, U56 through U63 (sheet 5)

One of the programmed IC's, or EPROM's (sheet 6) Check their sockets.

The reset circuit is not working. (see #1, above)

The microprocessor is bad. (sheet 4)

Data or address bus problem (e.g. U33 or U34, sheet 4, could be bad)

TRANSFORMER VOLTAGE CONVERSION INSTRUCTIONS:

To convert the game transformer to 100, 115, or 230 VAC, refer to the following chart:

For 100 Volts: Connect the voltage INPUT lines to terminals 1 and 2 on the transformer.

For 115 Volts: Connect the voltage INPUT lines to terminals 1 and 3.

For 230 Volts: Connect the voltage INPUT lines to terminals 1 and 4, with terminal 3 connected to the LAMP circuit.

Also, the TV monitor must be converted to the same voltage input as the game transformer. Refer to the monitor manual included in the game.

OPTIONS SELECTION CHART: To select the desired number of player cars. (Locate logic board connector labelled 'P3').

<u># of Cars</u>	<u>Pin 1</u>	<u>Pin 2</u>
4	HI	HI
5	LO	HI
5	HI	LO
6	LO	LO

Gremlin Industries, Inc. San Diego, California 92123		PARTS LIST	TITLE TOP ASS'Y HEADON 2		722-0013 DWG NO	SH 1 OF 9	A REV
			DRAWN S. MAGNOLIA	ENGR			
			CHECK <i>Steve P. Fay</i>	10-2-79	APPR		
LTR	DATE	REVISION DESCRIPTION		DRAFT	CHECK	APPR	
A	9-27-79	RELEASED		10-2-79	MAGNOLIA	<i>SH</i>	<i>SH</i>

Gremlin Industries, Inc. San Diego, California 92123			PARTS LIST		TITLE TELETYPE 1150-0012		722-0012 DWG NO		SH 2 OF 9		A REV	
ITEM NO	PART NO	QTY PER ASSY				DESCRIPTION	REF DES					
1	200-0054	1				SPEAKER GAME 6X9						
2	130-0002	1				SPEAKER COVER 6X9						
3	140-0021	1				COVER JUNCTION BOX						
4	140-0033	1				CABINET HEAD ON 19"						
5												
6	200-0011	1				MONITOR COLOR 19"ALGOL						
7	252-0075	1				MONITOR BOARD						
8												
9	822-0035	1				ASSY COIN MECHANISM						
10	210-0011	2				CONN INSUL BUTTSPLICE						
11	250-0032	1				FRAME BEZEL						
12	250-0034	1				SPRING RETAINER						
13	250-0038	1				MOLDING STRIP						
14	250-0048	1				CLIP SWITCH						
15												
16	250-0356	2				BRACKET MONITOR SUPP.						
17	181-0031	1				CHOKE 250uh 2.5 A						
18	156-0001	1				CAP 0.47uf 100 V						
19	253-0105	1				PANEL LOGO GRAPHIC						
20	253-0104	1				MONITOR PLEXIGLASS						
21												
22												
23	390-0011	1				LAMP FLOR.						
24	280-0004	25				CLIP WIRE HOLD DOWN						
25												

Gremlin Industries, Inc. San Diego, California 92123		PARTS LIST	TITLE TOP ASSY HEAD ON 2		722-0013 DWG NO	SH 3 OF 9	A REV
ITEM NO	PART NO	QTY PER ASSY		DESCRIPTION	REF DES		
26	280-0005	11		CABLE TIES			
27	280-0010	4		WIRE NUT			
28							
29							
30	800-0052	1		ASSY FLOR LAMP 18"			
31							
32	420-0028	1		S/N DECAL			
33	420-0030	1		DECAL CAUTION 115 V			
34	420-0038	2		IMPORTANT NOTE			
35	420-0040	1		DECAL RE-CYCLE			
36	420-0041	1		DECAL S/N SMALL			
37	420-0060	1		DECAL TIP-N-TELL			
38	420-0071	1		UNICRATING INSTRUCTIONS			
39	420-0116	1		WRAPAROUND SIDE			
40	420 0117			TOP COVER			
41	420-0124	4		CORNER STRIP			
42	420-0294	1		MANUAL ALGOL 19" COLOR			
43	420-0307			GRAPHIC LEFT SIDE			
44	420-0308			GRAPHIC RIGHT SIDE			
45	420-0309			GRAPHIC INTERIOR			
46	420-0310	1		DECAL CARTON			
47	420-0311	1		MANUAL HEAD ON			
50	807-0009	1		JUNCTION BOX			

Gremlin Industries, Inc. San Diego, California 92123		PARTS LIST	TITLE TOP ASS'Y HEAD ON 2	722-0013 DWG NO	SH 4 OF 9	A REV
ITEM NO	PART NO	QTY PER ASSY		DESCRIPTION	REF DES	
51	800-0029	1		HARN ASS'Y GROUND CABLE		
52						
53	815-0020	1		ASSY GAME PWR SUPPLY		
54						
55						
56						
57	822-0002	1		ASS'Y SOUND BOARD		
58	822-0034	1		CONTROL PNL ASS'Y COMP.		
59	822-0031	1		LOGIC BOARD		
60						
61						
62						
63						
64	822-0021	1		ASS'Y HARN MONITOR JUMPER		
65	822-0022			ASS'Y HARN GROUND CABLE		
66						
67		1		PALET HEAD-ON		
68		6		MACH SCR #8-32 X 2 SLOT HD		
69		4		PHL PAN HD SCR #6-X 3/8 SHT MTL		
70		7		SCR #6 X 1/2 PHL PAN HD SHT MTL		
71		4		SCR #8-32 X 1 1/2 SLOT HD		
72		2		NUT HEX #10-32		
73		4		SCR #8-32 X 1 1/2 SLOT HD		
74		14		BOLT CARRIGE 1A-24 X 1 3/4		
75		6		SCR 10-32 X 1.0 PHL PAN HD		

Growth Industries, Inc. San Diego, California 92121		PARTS LIST	TITLE	PC ASSY - POWER SUPPLY	815-0021	DWG NO	SH 1 OF	B REV
ITEM NO	PART NO	QTY PER ASSY		DESCRIPTION	REF DES			
1	170-0082			1	PCB - POWER SUPPLY			
2	150-0019			2	CAP E 4700 μ F, 25V	C5, C6		
3	151-0001			1	CAP. CER. .05 μ F, 50V	C11		
4	151-0002			2	CAP. CER 100PF, 50V	C17, C19		
5	151-0008			1	CAP. CER .001 μ F, 50V	C10		
6	151-0011			3	CAP. CER. .01 μ F, 50V	C12, C14, C16		
7	151-0012			1	CAP. CER. .01 μ F, 50V	C3		
8	153-0001			5	CAP. TANT 10 μ F, 25V	C1, C2, C7, C13, C15		
9								
10	212-0003			2	CONN M 10 PIN			
11	212-0004			2	CONN M 4 PIN			
12								
13	313-0001			1	IC LM723	U3		
14	313-0004			3	IC LM741EN	U1, U2, U4		
15								
16	471-0101			1	RES 100 Ω , 1/2W, 5%	R15		
17	471-0102			10	RES 1K Ω , 1/2W, 5%	R517, 20, 22-24, 35, 36, 38, 39		
18	471-0103			4	RES 10K Ω , 1/2W, 5%	R1, R14, R21, R37		
19	471-0104			1	RES 100K Ω , 1/2W, 5%	R33		
20	471-0122			1	RES 1.2K Ω , 1/2W, 5%	R18		
21	471-0152			2	RES 1.5K Ω , 1/2W, 5%	R13, R16		
22	471-0272			5	RES 2.7K Ω , 1/2W, 5%	R7, R25, R26, R43, R46		
23	471-0332			1	RES 3.3K Ω , 1/2W, 5%	R32		
24	471-0471			2	RES 470 Ω , 1/2W, 5%	R34, 40		
25	471-0473			2	RES 47K Ω , 1/2W, 5%	R44, R45		

Gardner Industries, Inc. San Diego, California 92161			PARTS LIST		TITLE PC ASSY - POWER SUPPLY		815-0021 DWG NO		SH 3 OF		B REV	
ITEM NO	PART NO	QTY PER ASSY				DESCRIPTION	REF DES					
26	471-0562					1	RES 5.6K 1/2W, 5%	R12				
27	472-00R5					4	RES 0.5, 1W, 5%	R4, R29-R31				
28	473-00R1					1	RES 0.1, 5W, 3%	R28				
29												
30	475-0004					1	POT 1K TRIMMER	R9				
31	475-0005					2	POT 2K TRIMMER	R8, R42				
32												
33	481-0004					4	DIODE MRSOI	D1-D4				
34	481-0006					2	DIODE 1N914	D7, D8				
35	481-0008					1	DIODE ZENER 1N5231	D10				
36												
37	482-0006					3	TRANSISTOR 2N4403	Q1, Q3, Q4				
38	482-0013					1	TRANSISTOR TIP 110	Q6				
39	482-0014					2	TRANSISTOR 2N4401	Q2, Q5				
40	482-0015					1	TRANSISTOR TIP 115	Q7				
41	482-0016					2	TRANSISTOR TIP 29	Q8, Q9				
42												
43	471-0133					1	RES 13K OHMS 1/2W 5%	R41				
44												
45	815-0020					REF	SCHEMATIC					
46												
47												
48												
49												
50												

00

[illegible]

GREMLIN IND. INC. SAN DIEGO CA. 92123		PARTS LIST	TITLE ASSY, POWER SUPPLY	815-0020 DWG NO	SH 2 OF 3	A REV
ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES
1	140-0015				1 CHASSIS, POWER SUPPLY	
2	150-0022				1 CAP,E, 9000UF 12V	
3	211-0005				9 CONN CRIMP LOCK	
4	211-0007				1 CONN,KEY , POLARIZING	
5	211-0017				4 CONN,QUICK, 1/4"FEM	
6	211-0019				2 CONN,SPADE LUG 1/4"	
7	212-0016				1 CONN FEM 10 PIN	
8	213-0006				1 SOCKET, T0-3	
9	280-0014				4 STAND-OFFS, CLIPS	
10	280-0056				1 CLAMP,CAP. VR4 1 1/2"	
11	481-0009				1 DIODE, MDA 3500	
12	482-0007				1 XISTOR, 2N3055	
13	560-0003				1 XFMR,MODEL 9-10345B	
14	815-0021				1 POWER SUPPLY ASSY (PCB)	
	815-0020				SCHEM. ASSY. PWR. SUPP. (REFERENCE)	
15					5 SCREW-MACH P.HD#6-32 X.5	
16					4 NUT HEX #6-32	
17					4 SCREW-MACH RD,HD #4-40 X.37	
18					4 NUT HEX #4-40	
19					4 RIVET,POP 3/16	
20					4 SCR, MACH , HEX,WAS,HD 1/4-20 X 5/8"	
21					1 SCR, MACH ,P.HD. #6-32 x 1.0"	

Greenlin Industries, Inc. San Diego, California 92123			PARTS LIST	TITLE HEAD ON SOUND	822-0002 DWG NO	SH 2 OF 6	B REV
ITEM NO	PART NO	QTY PER ASSY			DESCRIPTION	REF DES	
1							
2	151-0011	6			CAP CER .01 μ f 50V	C8,13,17,32,21,22	
3	151-0012	4			CAP CER .1 μ f 50V	C5,C12,C26,C27	
4	152-0001	3			CAP FILM .1 μ f 100V	C31,C20,C25	
5							
6	152-0012	3			CAP FILM .047 μ f 200V	C2,C23,C24	
7	152-0018	3			CAP FILM .01 μ f 250V	C3,C6,C19	
8	152-0020	3			CAP FILM .47 μ f 100V	C1,C18,C16	
9	153-0001	7			CAP TANT 10 μ f 25V	C10,C11,C28-C30,C33,C34	
10	153-0002	2			CAP TANT 1 μ f 25V	C4,C9	
11	153-0003	2			CAP TANT 2.2 μ f 25V	C14,15	
12	153-0004	1			CAP TANT 4.7 μ f 25V	C7	
13	170-0154	1			PCB HEAD ON SOUND		
14	212-0031	1			CONN M 12 PIN	P1	
15	313-0004	1			IC LM741 EN DIP	U3	
16	313-0008	1			IC LM348 DIP	U1	
17	314-0001	5			IC NE555 DIP	U2,U4,U9,U12,U14	
18	315-0005	4			IC 4013	U5-U8	
19	315-0009	1			IC 4081	U11	
20	315-0035	1			IC MM5837	U13	
21	315-0043	1			IC 4069	U10	

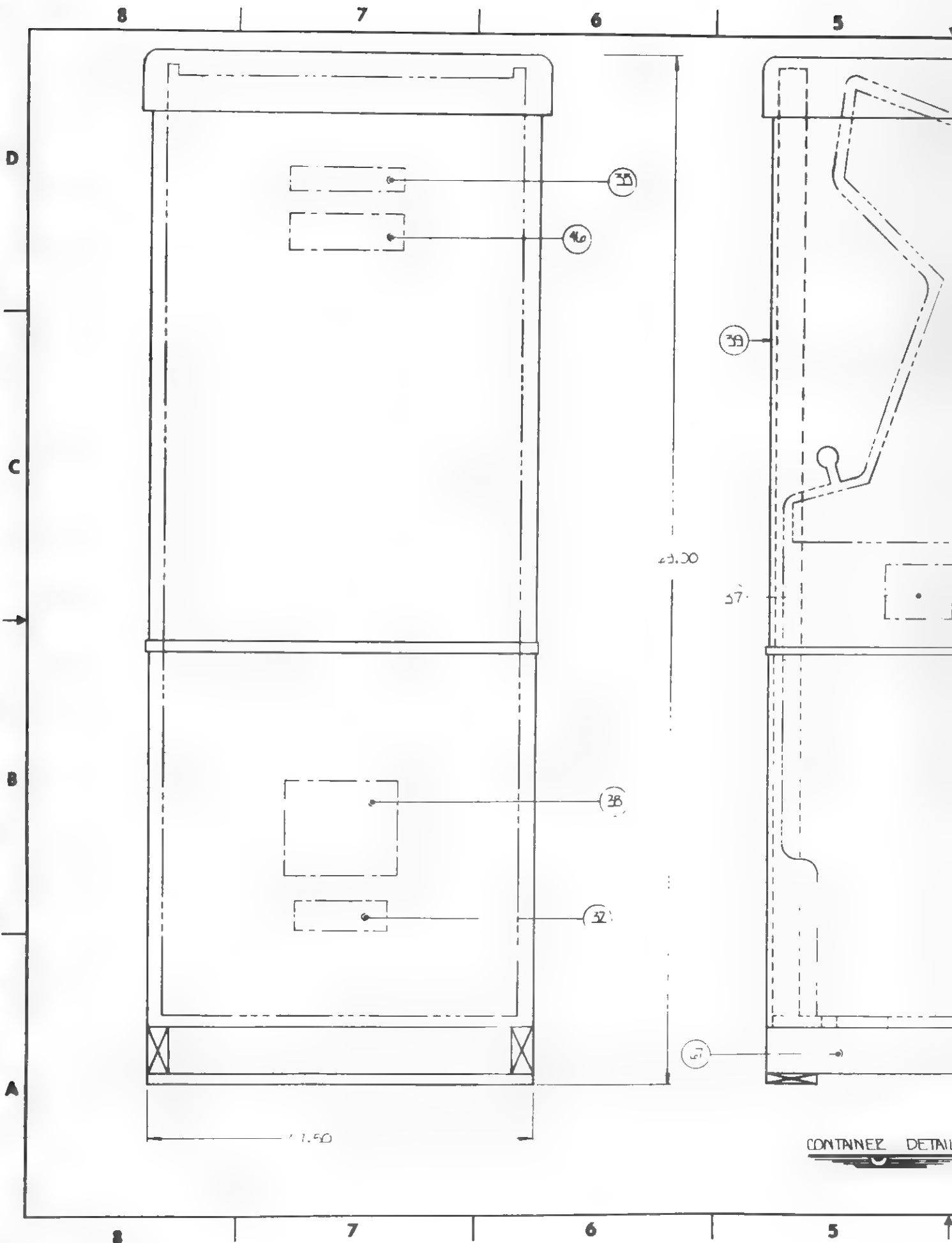
Gremlin Industries, Inc. San Diego, California 92123		PARTS LIST	TITLE HEAD ON SOUND		DWG NO	SH 3 OF 6	B REV
ITEM NO	PART NO	QTY PER ASSY		DESCRIPTION	REF DES		
22	471-0101	2		RES 100 OHM 1/2W 5%	R23, R32		
23	471-0102	10		RES 1K OHM 1/2W 5%	R4, R5, R8, R14, R22, R35, R45, R55, R72, R48		
24	471-0103	16		RES 10K OHM 1/2W 5%	R10, R12, R13, R25, R43, R46, R50, R56-R60, R64, R67, R68, R75		
25	471-0104	17		RES 100K OHM 1/2W 5%	R15-R21, R24, R34, R38, R41, R42, R62, R65, R69, R71, R76		
26	471-0105	3		RES 1 MEG OHM 1/2W 5%	R3, R70, R77		
27	471-0124	4		RES 120K OHM 1/2W 5%	R47, R51, R63, R66		
28	471-0153	2		RES 15K OHM 1/2W 5%	R1, R2		
29	471-0154	1		RES 150K OHM 1/2W 5%	R39		
30	471-0220	1		RES 22 OHM 1/2W 5%	R49		
31	471-0224	1		RES 220K OHM 1/2W 5%	R40		
32	471-0394	8		RES 390K OHM 1/2W 5%	R26-R31, R44, R73		
33	471-0472	3		RES 4.7K OHM 1/2W 5%	R36, R52, R74		
34	471-0473	1		RES 47K OHM 1/2W 5%	R33		
35	471-0474	2		RES 470K OHM 1/2W 5%	R9, R11		
36	471-0682	2		RES 6.8K OHM 1/2W 5%	R53, R54		
37	475-0006	2		POT 100K	R6, R7		
38	481-0006	8		DIODE 1N914/1N4148	D1-D8		

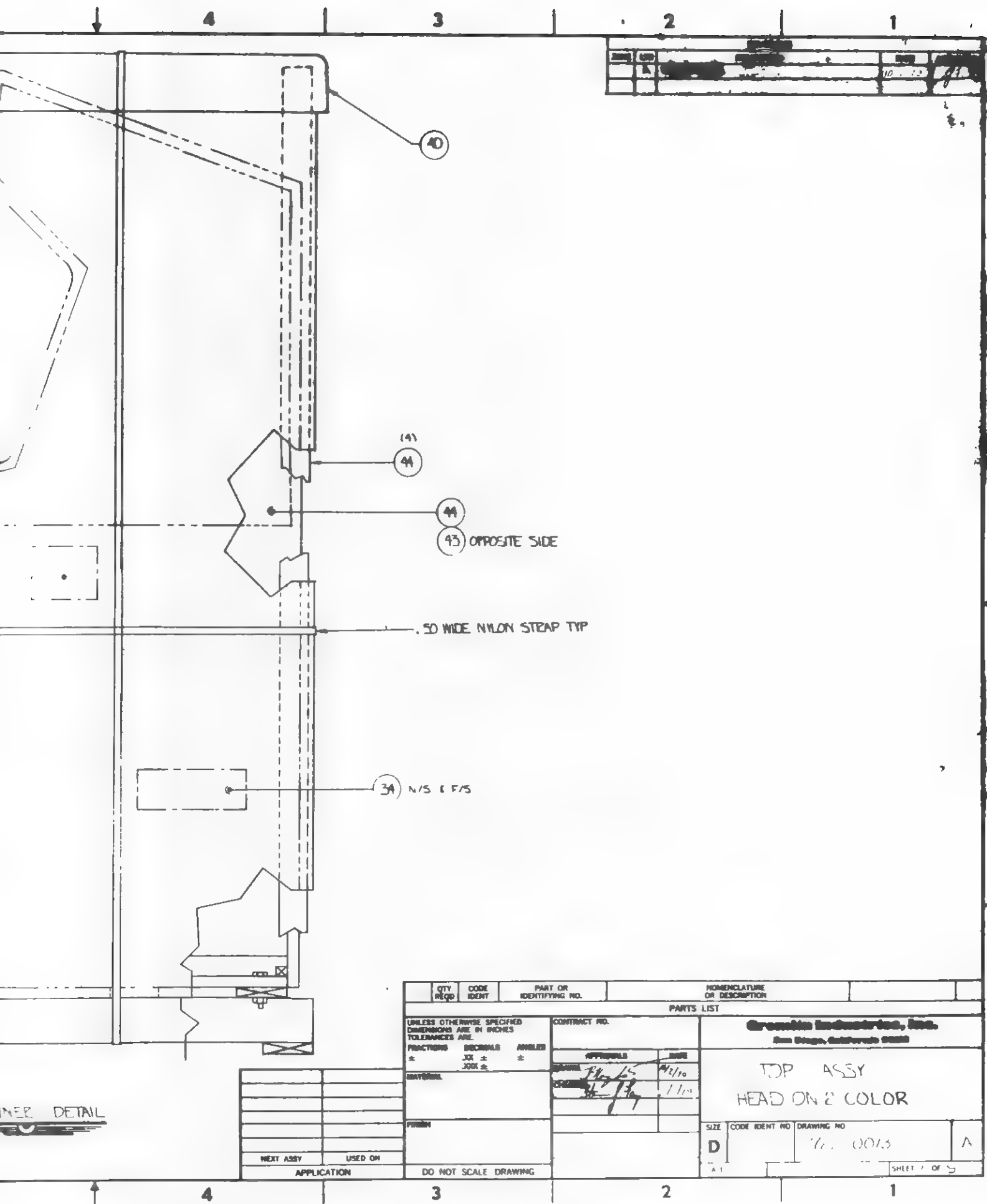
Greenline Industries, Inc. San Diego, California 92123		PARTS LIST	TITLE ASSY BASIC V.I.C. BD.		800-0031		SH 1 OF 8	REV C
WHIT 5,6,7,8 "D" SIZE		DRAWN Wynona 11-20-78		ENGR				
		CHECK Stan L. Fay 12-22-78		APPR				
LTR	DATE	REVISION DESCRIPTION		DRAFT	CHECK	APPR		
A	12-22-78	RELEASE		WJB	[Signature]	[Signature]		
B	5-10-79	CHG'D PER ECN 310		SB	[Signature]	[Signature]		
C	7-5-79	CHG'D PER ECN 310 & 321		WJB	[Signature]	[Signature]		

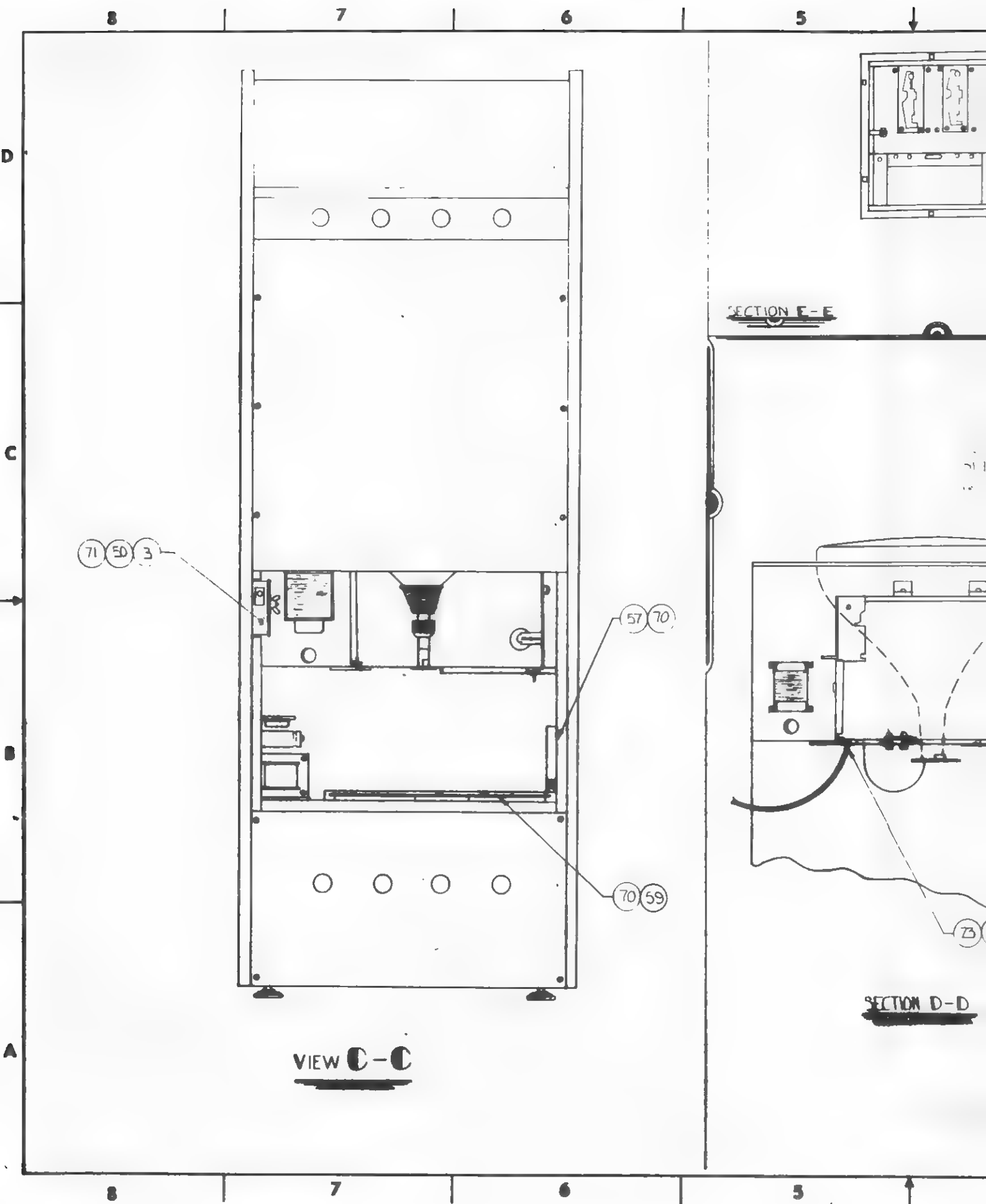
Greenlin Industries, Inc. San Diego, California 92123			PARTS LIST		TITLE ASSY BASIC V.I.C.B.D.		800-0031 DWG NO		SH 2 OF 8		REV	
ITEM NO	PART NO	QTY PER ASSY				DESCRIPTION	REF DES					
1	151-0012	1				CAP CER 680pf 50V	C39					
2	151-0012	54				CAP CER .1uf 50V	C3,5,7-11,13-17,22,25, C27-38,C40-67					
3												
4	152-0001	1				CAP FILM .1uf 100V	C4					
5	152-0017	1				CAP FILM .33uf 100V	C24					
6	153-0001	6				CAP TANT 10uf 25V	C12,20,21,23,26,68					
7	153-0002	1				CAP TANT 1uf 25V	C19					
8	151-0011	2				CAP CER .01uf 50V	C69,C70					
9	170-0150	1				PCB C.V. LOGIC						
10												
11	211-0004	7				CONN PIN TEST PT	TP1-TP4, 2ND					
12	212-0063	4				CONN M 4 PIN PLZD						
13	212-0021	7				CONN M 10 PIN						
14	212-0031	2				CONN M 12 PIN						
15	213-0003	4				SKT 14 PIN DIP	XU14,30,69,70					
16	213-0001	8				SKT 24 PIN DUAL INLN	XU20-XU27					
17	213-0004	18				SKT 16 PIN DUAL INLN	XRP2,XU5-8,33,34,44, XU56-63,65,66					
18												
19	213-0005	2				SKT 40 PIN DUAL INLN	XU48,XU53					
20	213-0008	7				SKT 20 PIN DUAL INLN	XU1-3,15,16,19,28					
21	213-0011	2				SKT 22 PIN DUAL INLN	XU17,XU18					
22	213-0010	1				SKT 8 PIN DIP	XU9					
23	230-0009	1				XTAL CLK 15.46848	Y1					
24	313-0023	1				IC 320T-5.0	U73					
25	314-0011	2				IC NE 555	U10,U55					

Gresman Industries, Inc. San Diego, California 92161		PARTS LIST	TITLE ASSY BASIC V.I.C.BD.		800-0031 DWG NO	SH 3 OF 8	REV C
ITEM NO	PART NO	QTY PER ASSY		DESCRIPTION	REF DES		
26	314-0015	1		1C 7404	U54		
27	314-0018	3		1C 74LS00	U4, U12, U32		
28	314-0019	2		1C 74LS04	U35, U64		
29	314-0040	3		1C 74LS125	U13, U46, U47		
30	314-0046	1		1C 74LS04	U68		
31	314-0073	3		1C 74LS175	U45, U49, U50		
32	314-0055	2		1C 74LS244	U1, U19		
33	314-0058	6		1C 74LS08	U29, 37-39, 41, 71		
34	314-0059	1		1C 74LS10	U52		
35	314-0061	1		1C 74LS42	U40		
36	314-0062	4		1C 74LS74	U11, U31, U67, U72		
37	314-0078	1		1C 74LS02	U36		
38	314-0092	2		1C 8216	U33, U34		
39	315-0039	8		1C 4K RAM 12 V	U56-U63		
40	315-0031	1		1C Z80 MK 3880	U53		
41	314-0086	1		1C 74LS163	U66		
42	314-0093	1		1C 74LS374	U16		
43							
44	316-0206	1		1C PROM 32X8 CTL	U65		
45	316-0138	1		1C PROM 32X8	U44		
46	390-0003	1		LED RED	D4		
47	471-0220	3		RES 22 OHM 5%	R26-28		
48	471-0011	5		RES 10 OHM 1/2 W 5%	R50-53, R29		
49	471-0102	10		RES 1K OHM 1/2 W 5%	R7-11, 32, 37, 56-58		
50	471-0103	1		RES 10K OHM 1/2 W 5%	R6		

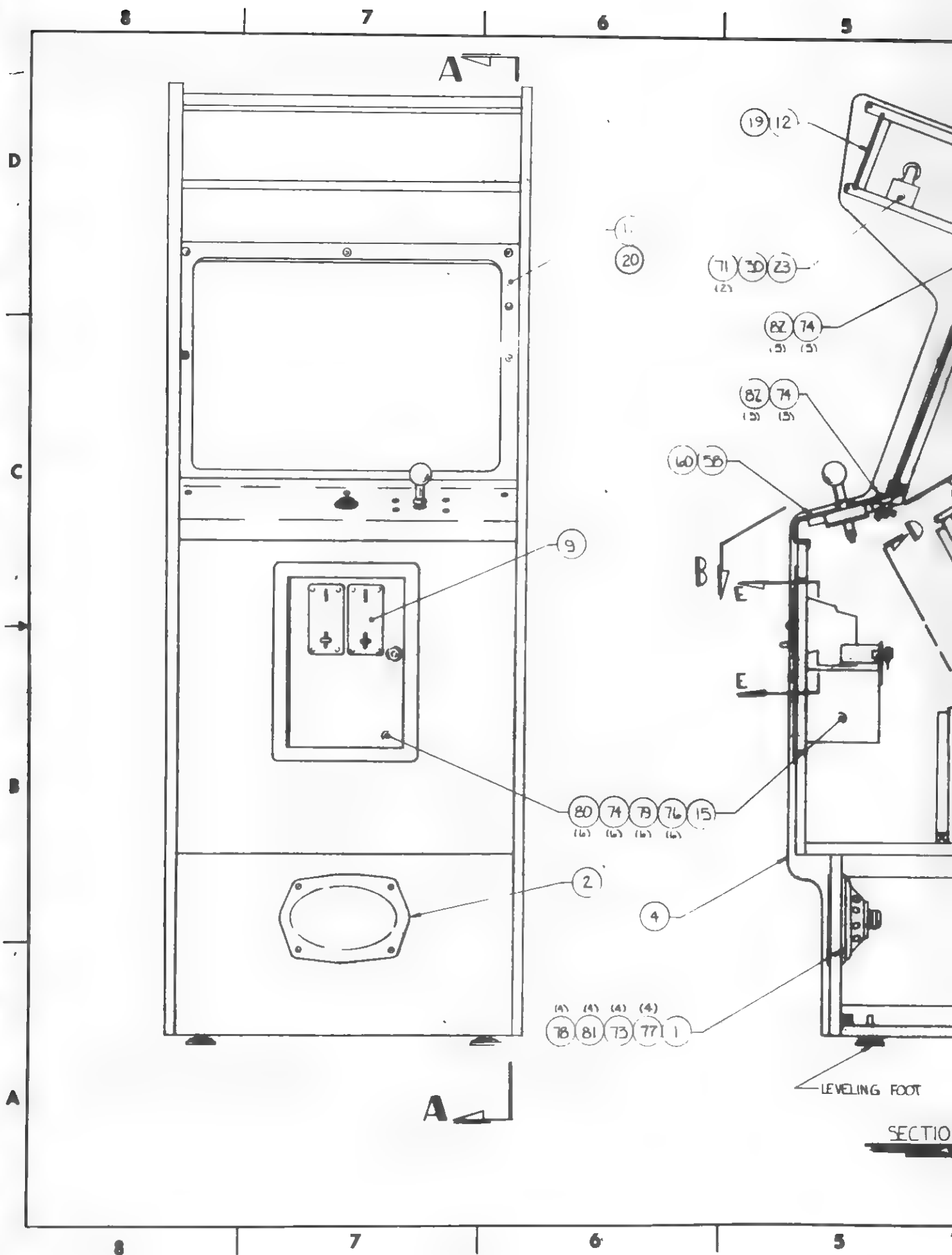
Greenline Industries, Inc. San Diego, California 92121			PARTS LIST		TITLE ASSY BASIC V.I.C.B.D.		800-0031 DWG NO		SH 4 OF 8		REV	
ITEM NO	PART NO	QTY PER ASSY				DESCRIPTION	REF DES					
51	471-0104	3				RES 100K OHM 1/2W 5%	R42-R44					
52	471-0222	8				RES 2.2K OHM 1/2W 5%	R18-R25					
53	471-0223	1				RES 22K OHM 1/2W 5%	R3					
54	471-0331	8				RES 330 OHM 1/2W 5%	R30,31,33,34,45,46,59,60					
55	471-0221	1				RES 220 OHM 5%	R55					
56	471-0471	1				RES 470 OHM 1/2W 5%	R49					
57	471-0472	3				RES 4.7K OHM 1/2W 5%	R5, R47, R48					
58	471-0750	1				RES 75 OHM 1/2W 5%	R41					
59												
60	475-0001	1				POT 10K PC MTV	R4					
61												
62	477-0002	2				RES PACK 15 X 2.2K	R1, RP3					
63												
64	481-0006	4				DIODE 1N914/1N4148	D1, D2, D5, D6					
65												
66	482-0006	1				XSTR 2N4403	Q6					
67	482-0010	1				XSTR PE8050	Q2					
68	482-0014	4				XSTR 2N4401	Q1, Q7, Q10, Q11					
69	510-0049	1				SWITCH 8 POS DIP SPST	SW1					
70	530-0006	1				HEAT SINK 295-1						
71												
72												
73	314-0072	1				IC 74LS174	U43					
74												
75	314-0076	1				IC 74LS157	U42					

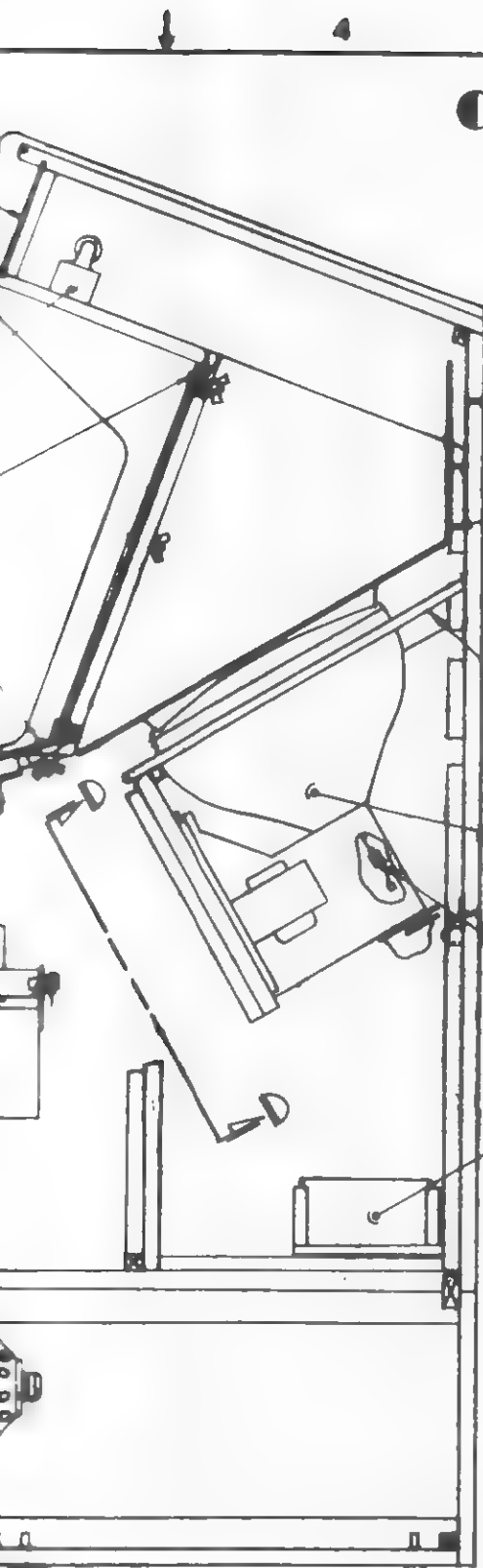






4		3		2		1	
<p style="text-align: center;">REAR DOOR</p>				REVISIONS ZONE LTR DESCRIPTION DATE APPROVED 16 CHANGED 17 18			
<p>SECTION D-D</p>				<p style="text-align: center;">TOP ASSY HEAD ON 2 COLOR</p>		Crescent Industries, Inc. 122-0013	
QTY REQ CODE IDENT PART OR IDENTIFYING NO. NOMENCLATURE OR DESCRIPTION		CONTRACT NO. APPROVALS DATE 12/15/77 1/24/79		PARTS LIST TOP ASSY HEAD ON 2 COLOR		SIZE CODE IDENT NO. DRAWING NO. D 122-0013 A	
APPLICATION USED ON DO NOT SCALE DRAWING		SCALE SHEET 3 OF 5					





REVISIONS				
REV	DATE	DESCRIPTION	BY	APP
A	11.10.10	RELEASED		

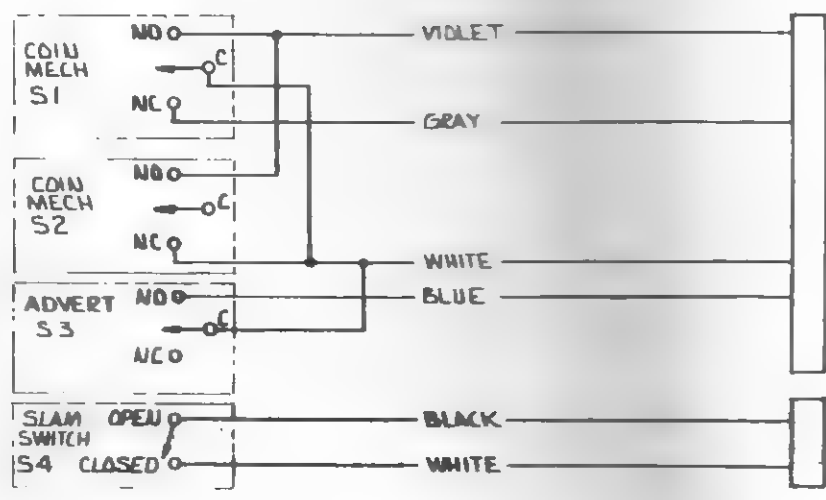
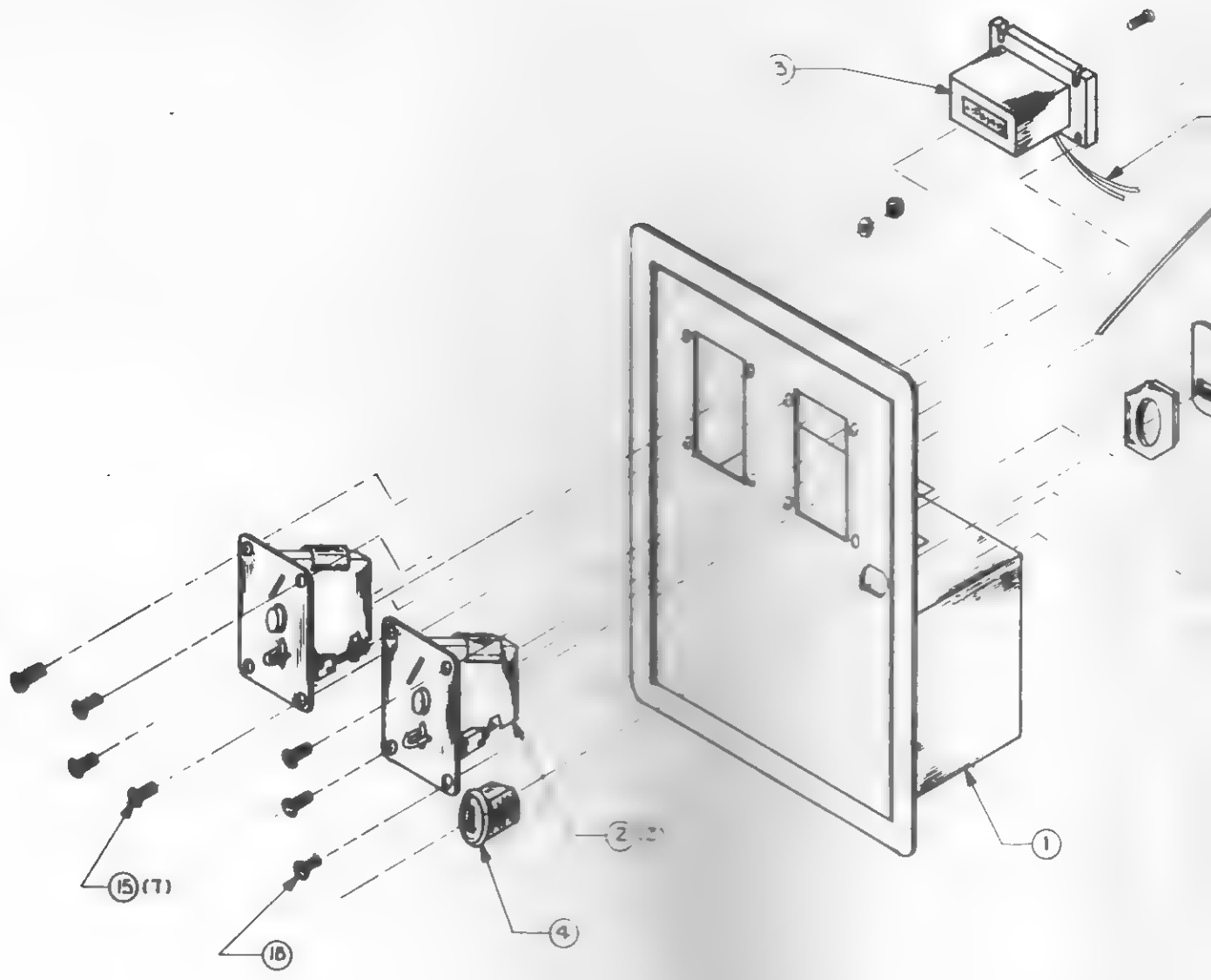
LONG FOOT

SECTION A-A

APPLICATION	USED ON

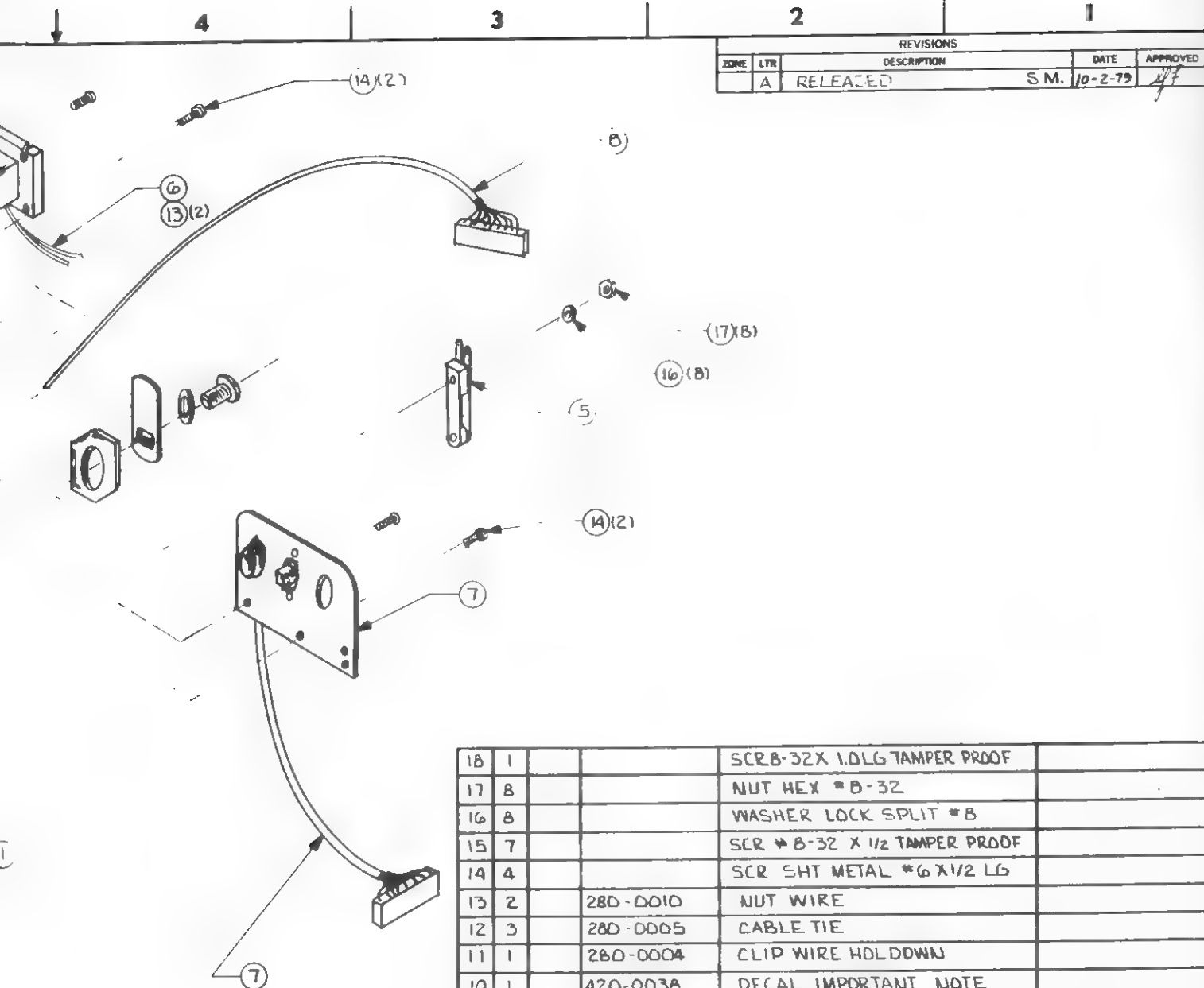
REV	CODE	PART OR IDENTIFICATION NO.	MANUFACTURE OR DESCRIPTION
PARTS LIST			
GREEN INDUSTRIES, INC. 10000 100TH AVE. N.E. TOLSON, WASH. D.C. PHONE: 202-544-1000 FAX: 202-544-1001 WWW: WWW.GREEN-IND.COM		DATE: 9/14/10 BY: [Signature] CHECKED: [Signature]	
TITLE: TOP ASSY HEAD ON 2 COLOR		SIZE: D	CODE IDENT NO: 1000010
APPLICATION:		SCALE:	DRAWING NO: A
DO NOT SCALE DRAWING		SHEET OF	

8 7 6 5



FOR CONNECTOR/
HARNESS PIN DESIGNATION
SEE 800-0060

8 7 6 5



CONNECTOR/
SS PIN DESIGNATIONS
00-0060

18	1			SCR B-32X 1.0LG TAMPER PROOF	
17	8			NUT HEX #8-32	
16	8			WASHER LOCK SPLIT #8	
15	7			SCR #8-32 X 1/2 TAMPER PROOF	
14	4			SCR SHT METAL #6 X 1/2 LG	
13	2	280-0010		NUT WIRE	
12	3	280-0005		CABLE TIE	
11	1	280-0004		CLIP WIRE HOLDDOWN	
10	1	420-0038		DECAL IMPORTANT NOTE	
9	1	800-0026		ASSY GROUND STRAP	
8	1	800-0060		HARNESS COIN MECH	
7	1	822-0006		ASSY HARNESS PWR/SOUND	
6	1	822-0010		ASSY HARNESS COIN CNTR	
5	1	800-0051		ASSY SLAM SWITCH	
4	1	220-0035		LOCK FORT LOCK IR	
3	1	220-0008		COUNTER DIGITAL	
2	2	220-0066		COIN MECH	
1	1	250-0285		CASH DOOR MODIFIED	
	QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	

PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ARE

FRACTIONS DECIMALS ANGLES
± .XX ± .XXX ±

MATERIAL

FINISH

HEAD ON 2

VIEW ASSY USED ON

APPLICATION

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS

DATE

DRAWN

CHECKED

10-2-79

10-2-79

10-2-79

10-2-79

10-2-79

Continental Engineering, Inc.
Newburgh, New York 12550

COIN MECHANISM ASSEMBLY

SIZE CODE IDENT NO. REV. A

D 822-0035

SCALE SHEET / OF /

D

C

B

A

822-0035

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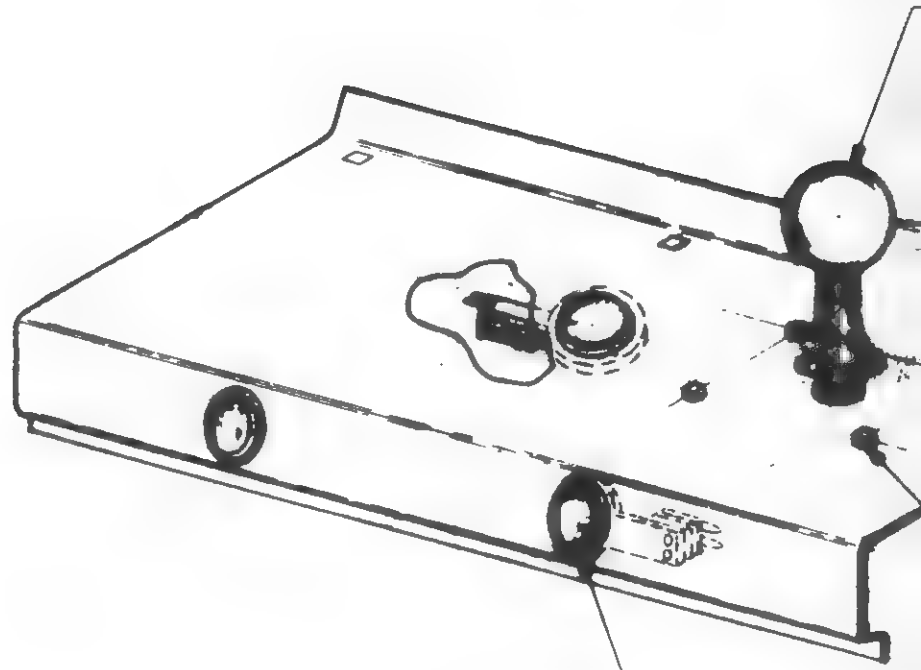
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- 10

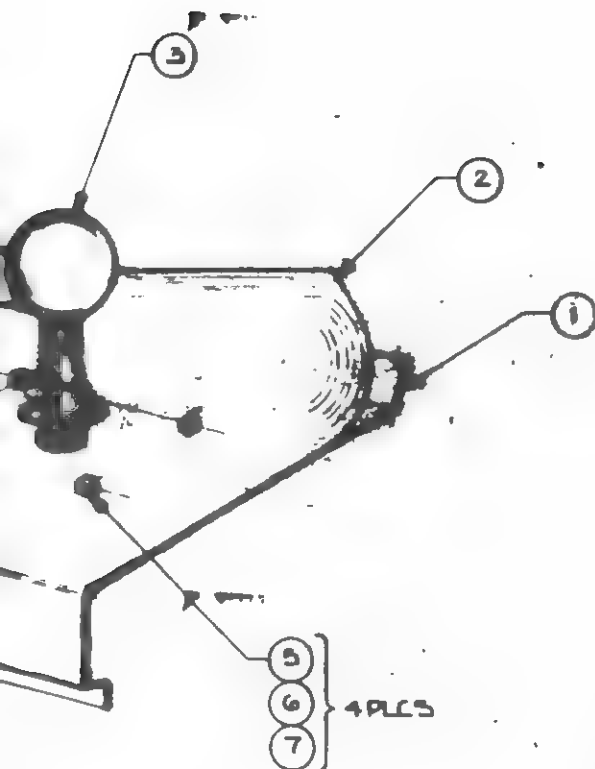
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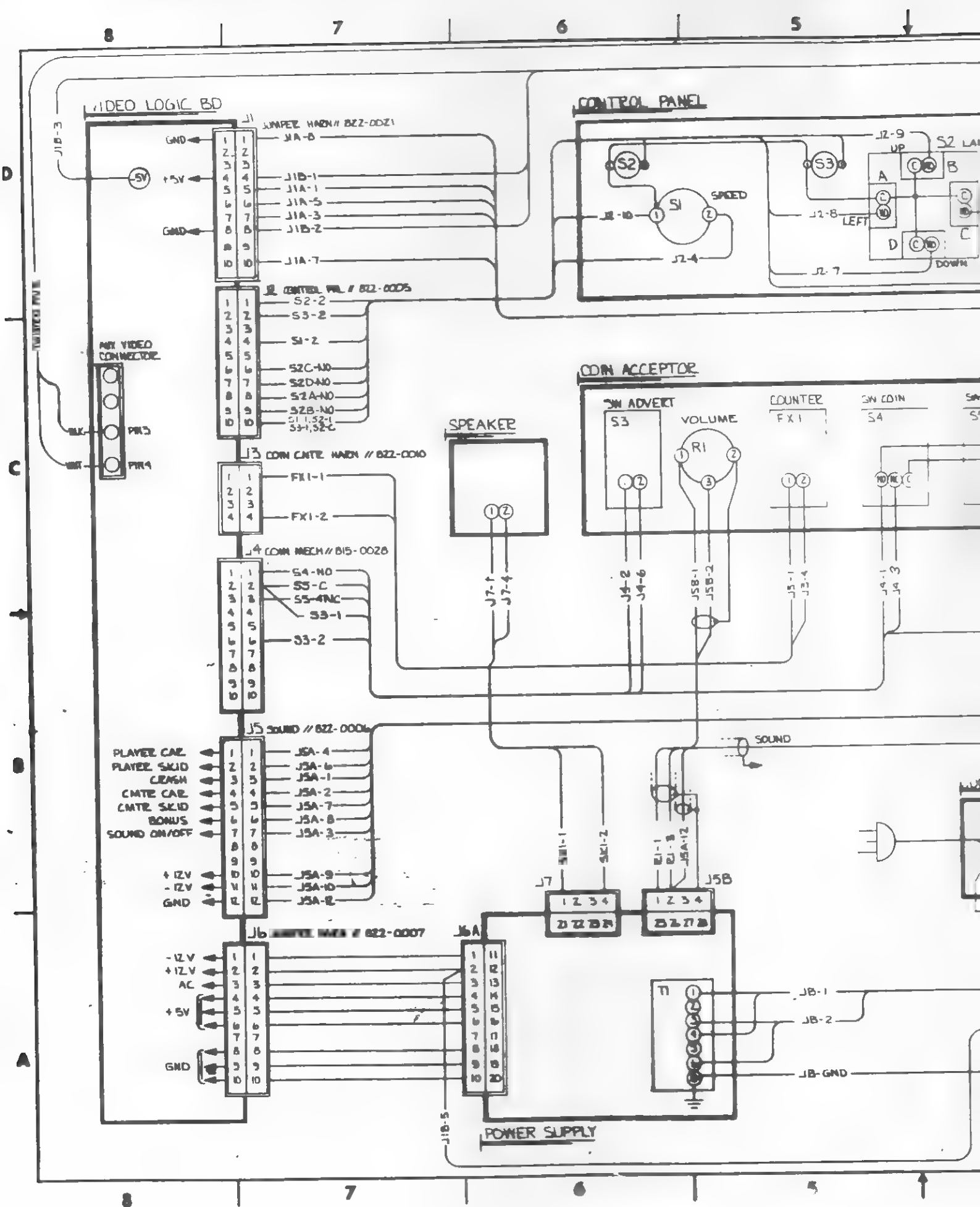
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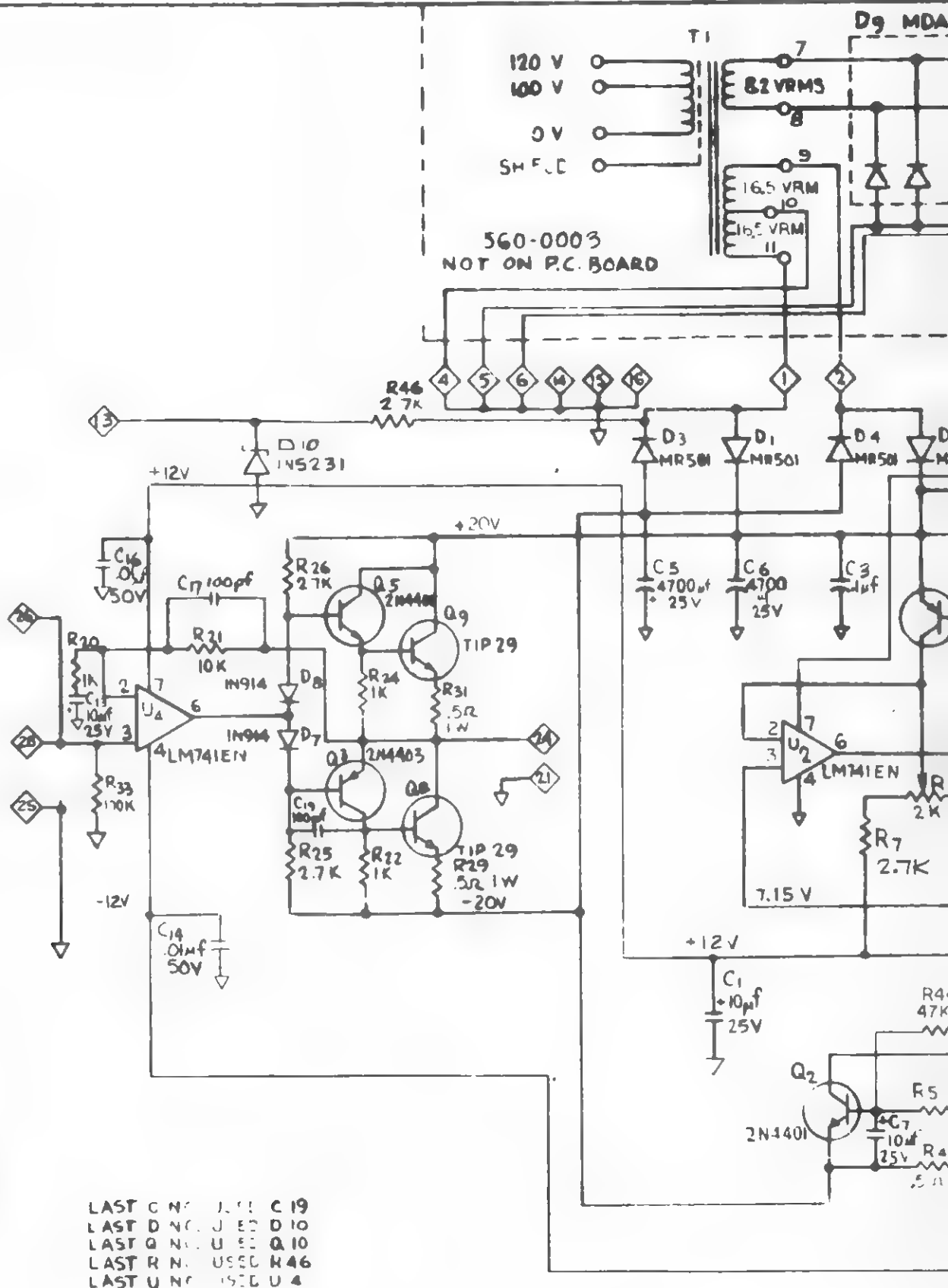


REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	SM. 10-2-79	

10	6		253-0031	SPACER WILD SWITCH		
9	3		240-0007	BUTTON PLUNGER BLACK		
8	3			PAL NUT 1/2 X 13		
7	4			NUT HEX #10-32		
6	4			WASHER LOCK SPLIT #10		
5	4			CARRIGE BOLT #10-32 X 3/4		
4	3		510-0023	SWITCH WILD		
3	1		800-0036	ASSY JOYSTICK		
2	1		253-0106	CONTROL PANEL GRAPHIC		
1	1		250-0365	CONTROL PANEL METAL		
QTY	CODE	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CONTRACT NO.		Greenlin Industries, Inc. San Diego, California 92108	
FRACTIONS ±	DECIMALS JXX ± JXXX ±	ANGLES ±	APPROVALS DRAWN BY CHECKED BY	DATE 10-2-79	CONTROL PANEL ASSEMBLY HEAD-ON 2
MATERIAL			SIZE D		
FINISH			CODE IDENT NO 822-0036		A
APPLICATION 722-0013 HEAD ON II NEXT ASSY USED ON			DRAWING NO 822-0036		
DO NOT SCALE DRAWING			SHEET OF		





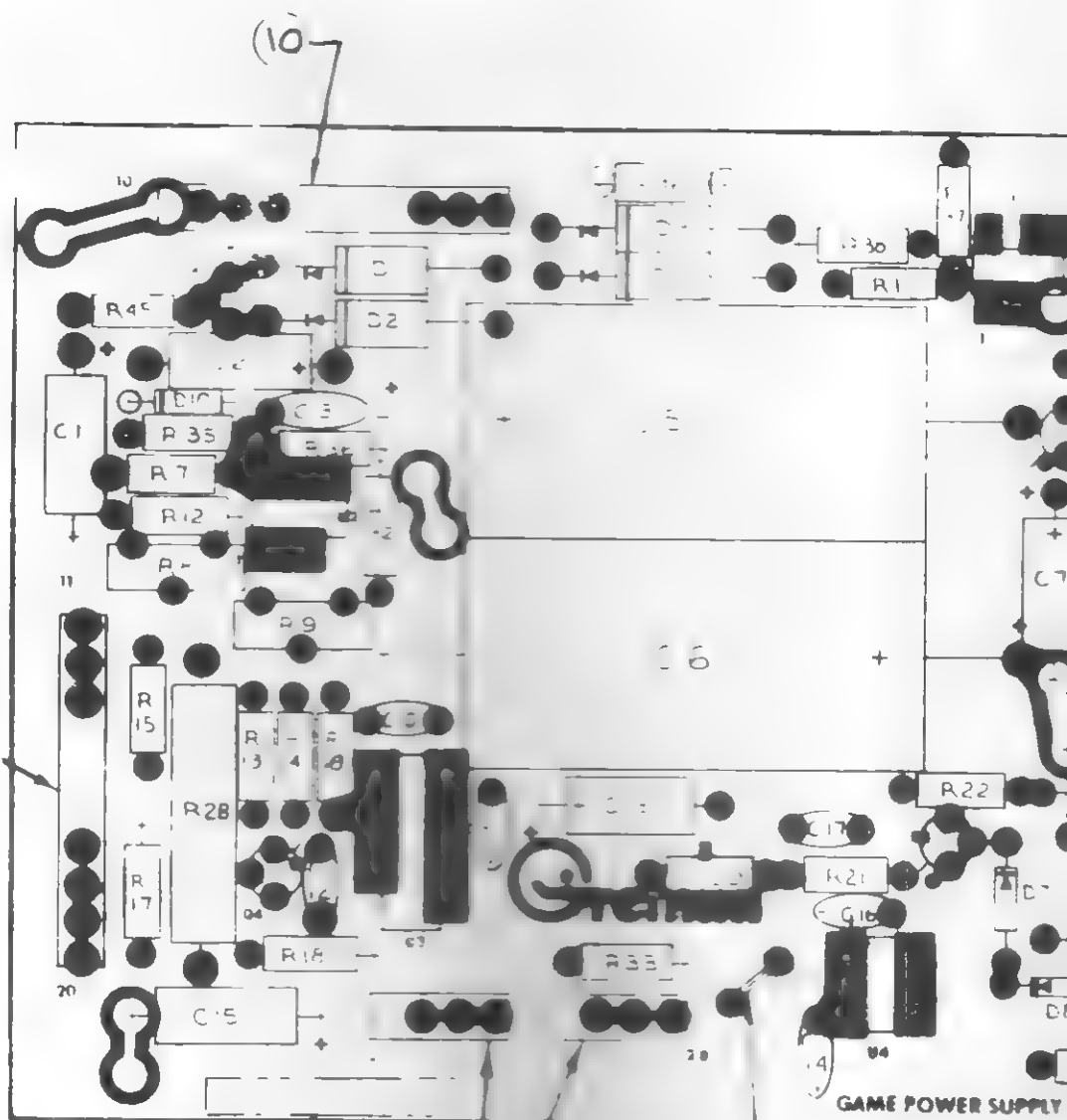
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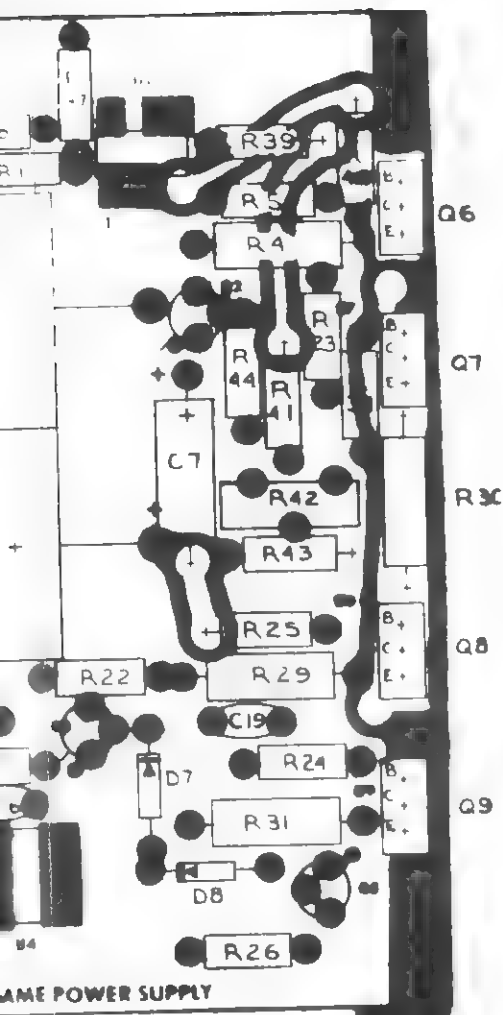


- JUMPER

REIDENTIFY ASSY
WITH NO. 815-0021
& LATEST REV

		Q RE
		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE TO BE IN TOLERANCE FRACTIONS ±
		MATERIAL
		FINISH
33-0020	PAIR SPLY ASSY	
NEXT ASSY	USED ON	
APPLICATION		DO NOT

2		1	
		REVISIONS	
ZONE	LTR	DESCRIPTION	DATE



PC ASSY - POWER SUPPLY

PER

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLES + XX ± + XXX ±		CONTRACT NO	Groskin Industries, Inc. San Diego, California 92108
MATERIAL		APPROVALS DRAWN <i>K. L. BLANC</i> 6/24/78 CHECKED <i>K. L. BLANC</i> 7/1/78	DATE 6/24/78 7/1/78
FINISH		SIZE C	CODE IDENT NO DRAWING NO 815-0021
DO NOT SCALE DRAWING		SCALE	SHEET 4 OF 1

PC 2 Sply Assy

USED ON

TION

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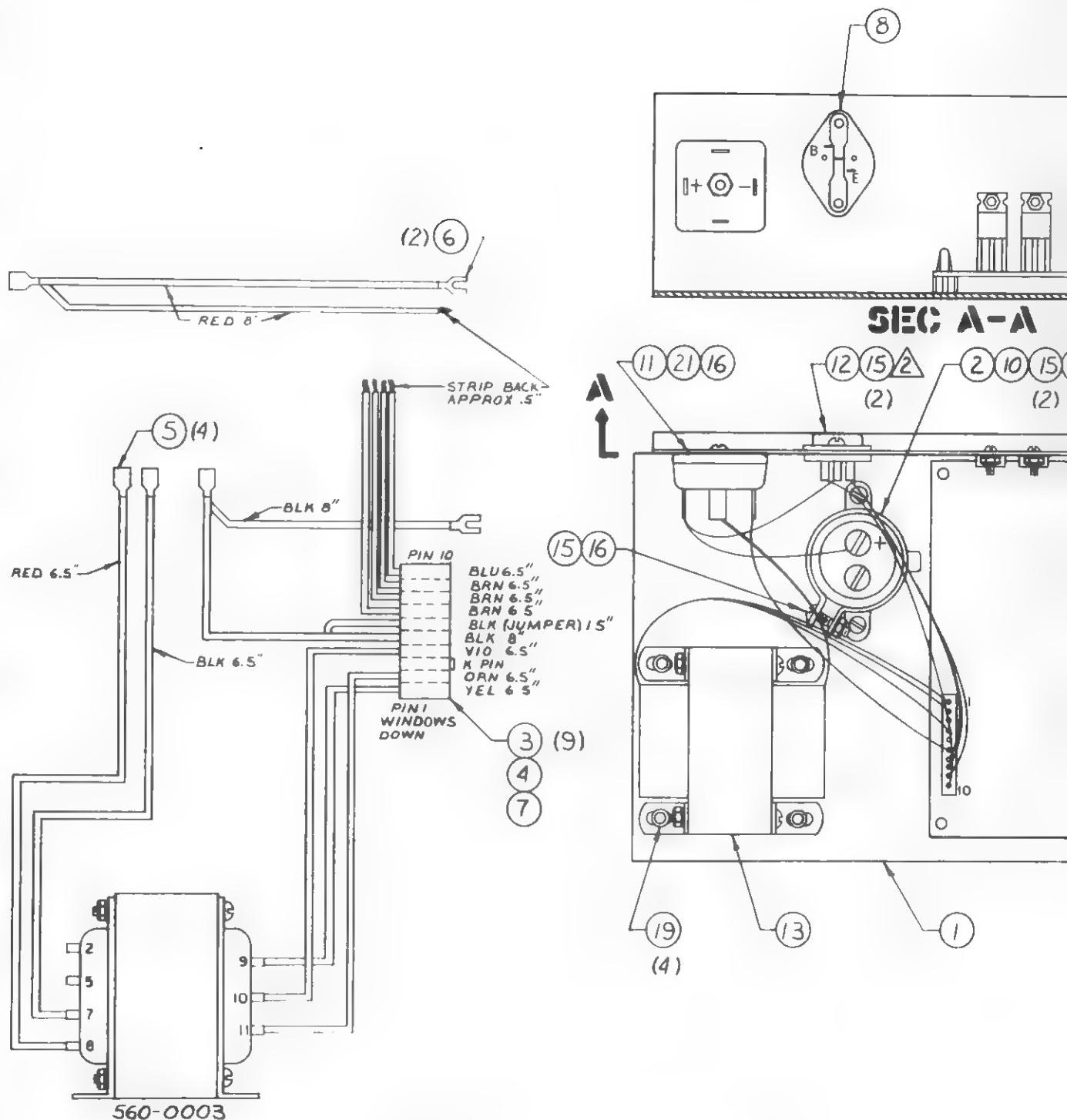
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△ ALL POWER TRANSISTORS TO BE MOUNTED WITH
HEAT SINKING PASTE & INSULATING HARDWARE
1. ALL WIRE TO BE AWG #22 GA

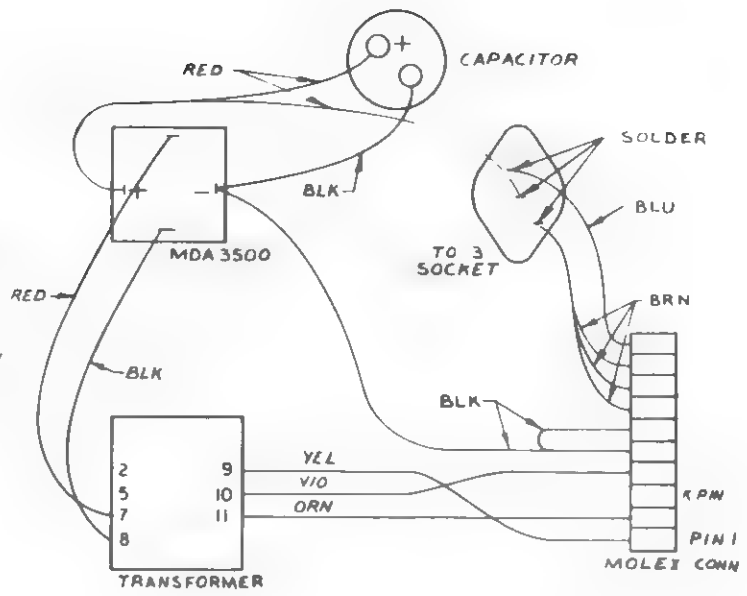
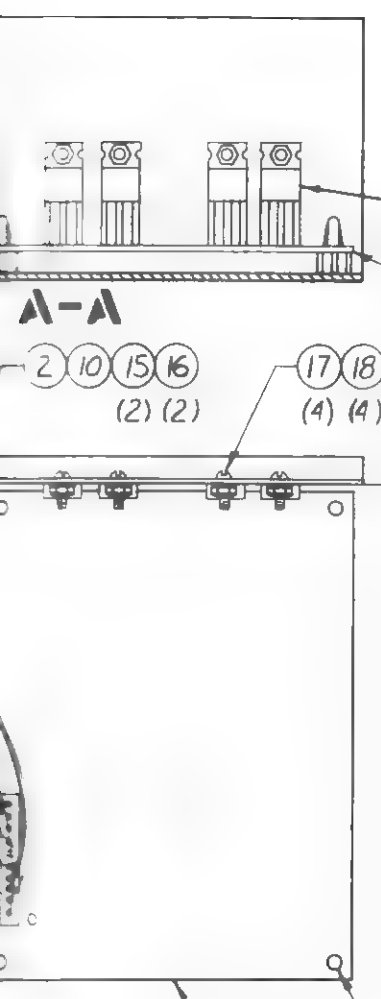
NOTES: UNLESS OTHERWISE SPECIFIED

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WIRING DIAGRAM

SEE DETACHED PARTS LIST 815-0020

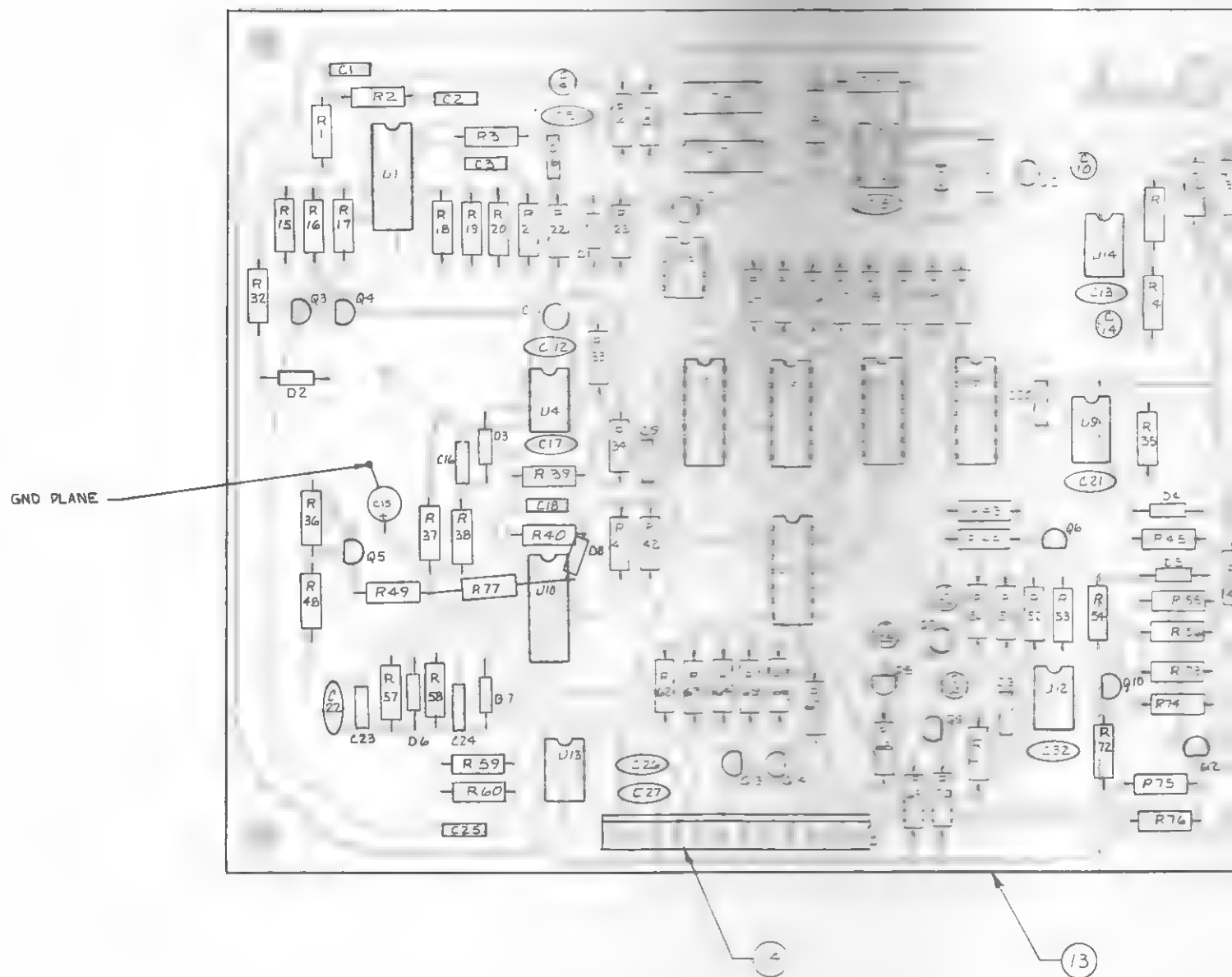
QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .010 ± .005 ±		CONTRACT NO. APPROVALS DATE	
		CHECKED DATE	
715-0001 SAFARI NEXT ASN USED ON		ASSY POWER SUPPLY	
APPLICATION		DO NOT SCALE DRAWING	
SIZE CODE IDENT NO. DRAWING NO. D 815-0020		REV A	
SCALE FULL		SHEET 3 OF 4	

D

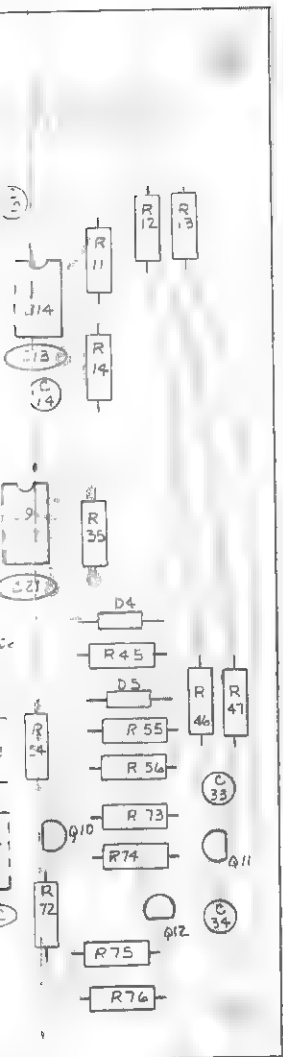
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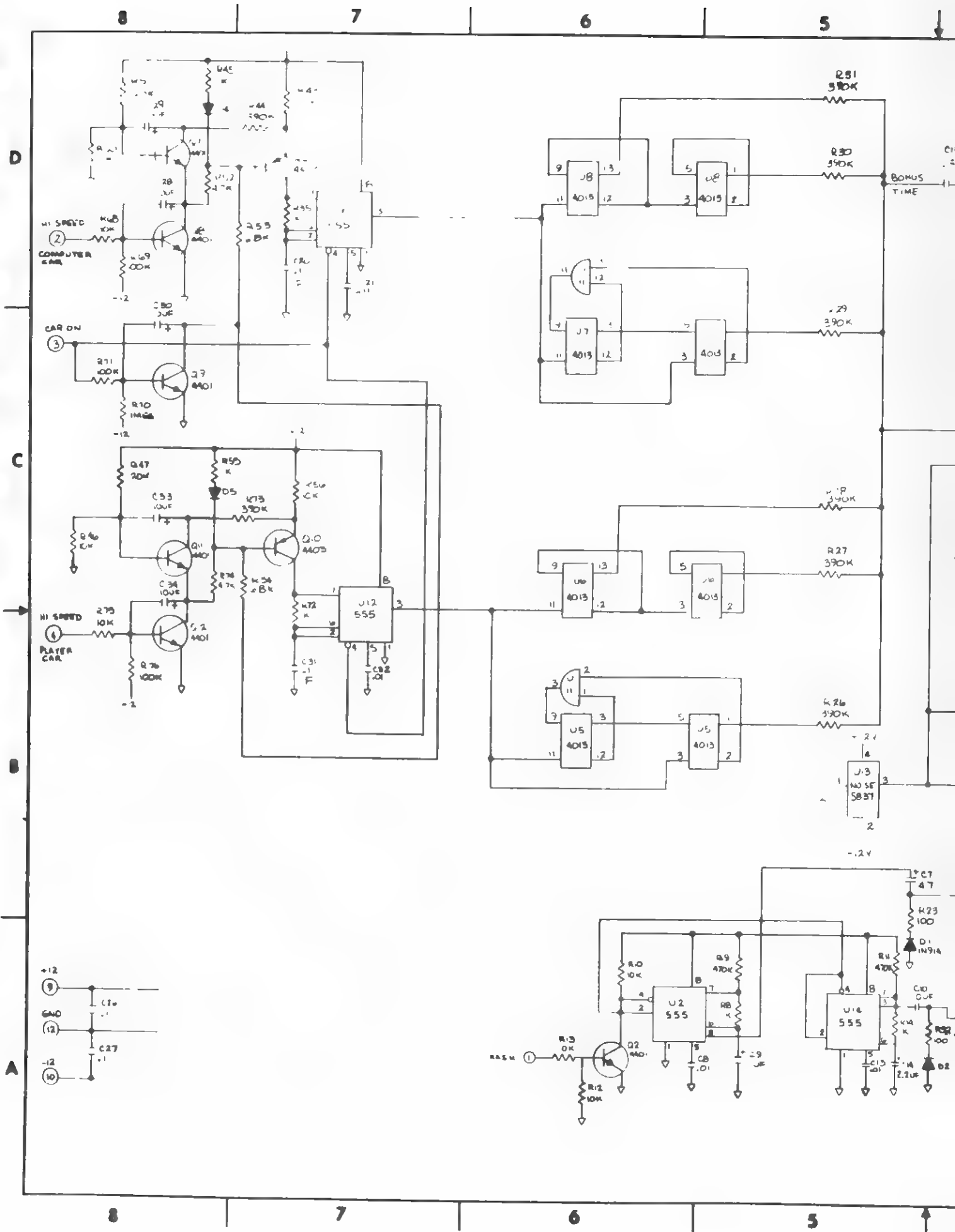


REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
A		RELEASED	1-8-79	
B		ECN 273 1-25-79 ADDENDUM 273	1-25-79	



SEE DETACHED PARTS LIST

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:			
FRACTIONS	DECIMALS	ANGLES	
±	.XX ±	±	
	.XXX ±		
MATERIAL			
FINISH			
DO NOT SCALE DRAWING			
CONTRACT NO.			
APPROVALS			
DATE			
DRAWN			
CHECKED			
Gremlin Industries, Inc. San Diego, California 92123			
PC ASSEMBLY HEAD ON SOUND			
SIZE			
CODE IDENT NO			
DRAWING NO.			
822-0002			
SHEET 5 OF 6			



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4		3		2		1	
				REVISIONS			
ZONE	LTR	DESCRIPTION		DATE	APPROVED		
	A	RELEASED		10-22-73	11		
	B	PER ECN 310		5-1-74	11		
	C	PER ECN 318 & 321		5-8-74	11		

2) 4 PLACES



14

11 7 PLACES

SEE DETACHED PARTS LIST

QTY REQD	CODE IDENT	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION
PARTS LIST			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE		CONTRACT NO.	
FRACTIONS	DECIMALS	ANGLES	APPROVALS
±	XX ±	±	DATE
	XXX ±		
MATERIAL		DRAWN <i>W. J. B. CARD</i>	
FINISH		CHECKED <i>W. J. B. CARD</i>	
NEXT ASSY		SIZE CODE IDENT NO DRAWING NO	
USED ON		D 800-0031 C	
APPLICATION		SCALE 1/1 SHEET 2 OF 3	
DO NOT SCALE DRAWING			

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800-0031 C

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